REMARKS

The courtesies extended to the undersigned by Examiner Hemant Desai during the telephone discussions held April 7 and 8, 2009 are acknowledged and appreciated. A proposed amended claim 22 was submitted to Examiner Desai prior to the telephone discussion of April 7, 2009 and was discussed during the telephone discussions. It is believed that the currently amended claim 22 overcomes the rejections to the claims, as set forth in the Final Office Action of January 15, 2009. Examiner Desai indicated that the proposed amendments to claim 22 would raise new issues and would require additional searching. Accordingly, a second Request For Continued Examination is being filed concurrently herewith. Reexamination and reconsideration of the application, and allowance of the claims is respectfully requested.

As described and depicted in the specification and drawings of the subject invention, as set forth in currently amended claim 22, and as has been discussed with Examination Desai, the subject invention is directed to a product folding device. Specifically, the subject invention is directed to a device that is usable to synchronize the vertical reciprocation of a folding blade with the phase relation of a product to be folded. The result is that the product will be folded when it is properly located beneath the vertically reciprocable folding blade.

Folding blade assemblies of this general type are well known in the prior art. In typical operation, a stream of newspaper sections are fed by a conveying means, such as a pair of spaced belt conveyors, to a location generally beneath the vertically reciprocable folding blade. In theory all of these products to be folded are spaced properly on the conveying means and arrive at the proper location on the folding table at

the correct time so that each product will be correctly aligned below the vertically reciprocable folding blade. However, in actual practice, the series of products being conveyed to the product folding device by the conveyor belt are not all equally spaced and are not all in the correct position. The result is that a particular one of the products to be folded will arrive at its location on the folding table either too early or too late, with respect to the optimum product folding time. If the specific product arrives too early, the blade may still be moving upwardly from its prior folding operation and the leading end of the next arriving product will strike it. Alternatively, the early arriving product will pass along the folding table so that its leading end is past its proper location. The blade, as it now moves down at the product folding line, will not squarely engage the product. As a result, only the trailing end of the product will be pushed down by the folding blade into the underlying folding rollers. The product will be improperly folded.

If the product is out of position on the conveyor belt and arrives at the location beneath the folding blade too late, the same problems are again apt to occur. The blade may already be moving down and the product's path to its location beneath the blade may be blocked. A jam occurs and the machine has to be stopped. If the product is able to start to pass under the blade, before the blade reciprocates down, but is not squarely beneath the blade, the leading end of the product will be pushed down by the blade into the folding rollers before the trailing end is beneath the blade. Again, the result is either an improperly folded product or a jam or blockage.

In accordance with the present invention, as is recited in currently amended claim 22, an optical product sensor is located adjacent the folding table, and before the folding blade, in the direction of transport of the products to be folded. This sensor is

usable to determine a phase relation of each individual product. As has been discussed in prior amendments, and as is set forth in the Substitute Specification, the product phase relation, as determined by the optical product sensor, is more than just a detection of when a leading edge of a product passes the sensor. Instead, the sensor determines, at a particular time, what part of the product is beneath the sensor at that time. Since the product is typically a printed product, the optical sensor can determine, with a great deal of accuracy, what portion of the product is beneath it at a specific time. The product phase relation is usable, by a folding blade motor control device, to control the folding blade motor. This results in the synchronization of the folding blade, at the product folding time, with the receipt of the product on the folding table and beneath the vertically reciprocable folding blade. The control of the folding blade drive motor by the folding blade motor control device, in response to the product phase relation, as determined at a point before the folding blade, insures that the instant at which the vertically reciprocable folding blade engages the product is the same instant when the product is correctly aligned on the folding table beneath the vertically reciprocable folding blade.

The control of the folding blade drive motor to synchronize the vertical reciprocation of the folding blade at the product folding line, with the product alignment on the folding table beneath the folding blade, insures that each product will be folded properly. As each product passes the product sensor, and its phase relation is determined, the folding blade motor control device will control the folding blade motor to properly synchronize the product folding time with the alignment of the product on the folding table beneath the blade. This control can be accomplished quickly and

accurately for each individual product. The use of the optical sensor to determine the product phase relation is a very accurate way to provide the correct information to the folding blade motor control device.

In the Final Office Action of January 15, 2009, claims 22 and 23 were rejected as being anticipated by EP 1 211 212 to Bressert, which is referred to in the Office Action as the "German reference". It will be discussed in this amendment as Bressert or EP 1 211 212.

It was asserted that Bressert disclosed all of the structures recited in then pending claim 22. It was further asserted that the language of claim 22, at the end of the last claim clause, and reciting the use of the optical product sensor to determine the product phase position and the use of the folding blade drive motor control device to control the folding blade drive motor to synchronize the vertical reciprocation of the folding blade at the product folding time was a functional recitation that was not given patentable weight. For that indicated functional recitation to be given patentable weight, it was asserted that the recitation had to be expressed as a means plus function recitation.

Claims 22-29 and 34 were rejected under 35 USC 103(a) as being unpatentable over Bressert and further in view of US Patent No 4,269,402 to Fischer. It was asserted that Bressert shows all of the claim limitations except for the provision of a slow down buffer. Such a buffer was asserted as being shown in Fischer.

Claims 30-32 were rejected under 35 USC 103(a) as being unpatentable over Bressert in view of DE 1980 2995. It was asserted that the German '995 reference discloses the structure of a shunt arrangement.

In an alternative rejection, claims 22 and 23 were rejected under 35 USC 103(a) as being unpatentable over Bressert in view of US Patent No 4,514,963 to Bruno. It was admitted, in this alternate rejection, that Bressert does not show the use of a sensor to determine the product phase relation and to synchronize the vertical reciprocation of the folding blade at the folding time. It was asserted that Bruno uses a sensor to determine a product phase relation, in conjunction with a controller, to synchronize a speed of a conveyor in proportion to a degree of deviation of a product. It was asserted that it would be obvious to substitute the Bruno product phase relation sensor in the Bressert device.

The rejection of the rest of the claims was restated using the combination of Bressert and Bruno instead of the Bressert reference by itself. The two secondary references, Fisher and DE 1980 2995 were applied in combination with Bressert and Bruno.

As was discussed with Examiner Desai by telephone on April 7 and 8, 2009, and for the reasons to be set forth below, it is believed that the subject invention, as recited in currently amended claim 22, which currently amended claim 22 is changed from that submitted by e-mail to Examiner Desai on April 6, 2009, is patentable over the prior art. The selected combination of features of the Bressert and Bruno references, as asserted by the Examiner, would not be readily apparent to one of skill in the art absent the teachings of the subject application. It is not proper to select some features of a secondary reference while ignoring the rest of the teachings of that reference.

The Bressert reference has been discussed in great detail in the several previous amendments. It is directed to a generally similar device that is usable to fold a printed

product. As was admitted by Examiner Desai in the Final Office Action, in his discussion at the middle of page 5, Bressert does not teach that a sensor can be used to determine a product phase relation and to synchronize the vertical reciprocation of the folding blade at the folding time. Claim 22 has been amended, in accordance with Examiner Desai's suggestion at the top of page 3 of the Detailed Action, to set forth the means for controlling the folding blade motor, using the folding blade motor control device, in response to the product phase relation determined by the optical product sensor. This control is usable to synchronize the vertical reciprocation of the folding blade, at the product folding time, with the alignment of the product to be folded beneath the vertically reciprocable folding blade. It is thus believed that claim 22, as currently amended, is not anticipated by the Bressert reference.

In the Final Office Action of January 15, 2009, Examiner Desai provided a machine translation of the German text of the Bressert reference. While that translation is difficult to understand, it does generally set forth the operative structure of the Bressert reference. A detector 14 is placed on the path of travel of a product 12, referred to in the translation as a "laminar subject matter". The detector 14 is located at a known distance D from a front edge detector 36 on the folding table. The product 12 is being conveyed to the folding device, which includes a vertically reciprocable blade 34, at a known velocity V. As discussed in the machine translation of Bressert, at paragraph 0021 thereof, the arrival time of the front edge of the product at the front edge detector 36 can be determined, knowing the time at which the front edge passed the detector 14 and knowing the distance D and the velocity V. This is a straightforward time function calculation. Assuming that the distance D and the velocity V do not

change, the time from the passage of the product leading edge past the detector D, to the time of the arrival of that leading edge at the front edge detector, can be calculated accurately. That time calculation is then used to control the reciprocation of the vertical folding blade 34.

While the structure and operation of the Bressert publication is acceptable, there are operational reasons why it is apt to fail. The detector 14 is usable to indicate the passage of either a leading edge or a trailing edge of a product 12. This is discussed in paragraph 0022 of the machine translation. If the detector 14 is not left on all of the time, it will not be able to always detect the passage of one or the other of a product leading or trailing edge. If the detector 14 is operated only intermittently, when it is expected that a product leading edge or trailing edge will cross its path, and the product is not located where it should be, it is possible that the detector 14 will not sense the product leading or trailing edge. The time of reciprocation of the folding blade will thus not be adjusted. The result may be that the improperly positioned product, which needs to cause the time of the reciprocation of the folding blade to be adjusted, will not trigger that process. The poorly positioned product 12 may not have its leading edge detected by the detector 14, if the detector 14 is only on at selected times.

If the detector 14 is always on, it is apt to be subject to false readings. The passage of a large number of products 12 past the detector 14 which is always on, and with the possible mis-location or mis-positioning of the successive products 12, can result in erroneous determinations, by the detector 14, of whether a leading edge of a new product 12 or the passage of a trailing edge of a prior product 12 has passed the detector. As discussed with Examiner Desai, these longitudinal folding devices work at

a high rate of speed and typically fold thousands of products in an hour. Given such a high speed of operation and the minimal spacing distance between successive products, it is within the realm of possibility that the detector 14 will become confused and will not be able to properly determine whether the last detection was of a product leading edge or a product trailing edge. Such an error will obviously affect the ability of the vertically reciprocable folding blade to properly fold each product, as that product arrives at the front edge detector 36. In summary, the Bressert reference relies on a calculation based on the sensing of a passage of a leading or trailing edge of a product, together with a known travel distance and a known velocity of travel to regulate the time at which a folding blade reciprocates. This is not the same as the product folding apparatus set forth in currently amended claim 22.

The secondary reference to Bruno, US Patent No 4,514,963 is initially noted to be directed to a system for regulating the feed of articles to a wrapping machine. It is not directed to a longitudinal product folding device. It is not directed to a device that includes the use of a folding blade. It is not readily apparent to the undersigned, or to the inventor's principal representatives in Germany that one seeking a solution to a problem encountered with a longitudinal product folding device of the type described in the subject application would look to the field of wrapping machines for a solution.

In the Bruno patent, a series of articles 2 are carried along on a conveyor device 4. That conveyor device 4 is provided with spaced upstanding blades or lugs 5, each of which can engage a trailing surface of one of the articles 2 and which will carry each such article to a wrapping machine, generally at 3. The invention disclosed in Bruno is a system for regulating the feed of articles 2 that are to be delivered to the conveyor

device 4. By use of the Bruno invention, the articles 2 will arrive at the conveyor device 4 in a predetermined phase relationship so that each such article 2 will be engaged by one of the blades 5 on the conveyor belt 4. The belt 4 is usable to convey each article 2, in its properly phased position, to the wrapping machine 5. It is important to note that the purpose of the Bruno device is to properly phase the articles 2 before those articles are placed on the conveyor belt 4 for transport to the wrapping machine 3.

A conveyor means, generally at 1, is usable to feed the series of articles 2 to the wrapping machine 3, which wrapping machine 3 is provided with the conveyor device 4 that carries the blades 5. A first conveyor belt 6, which is before the conveyor belt 4 that is part of the wrapping machine 3, is used to accumulate the articles 2 which are to be wrapped. These articles 2 are fed from the upstream, accumulating conveyor 6 to an intermediate conveyor 7. The intermediate conveyor 7 runs at a linear speed which is greater than the linear speed of the upstream, accumulating conveyor 6. As discussed at column 2, lines 31-34 of Bruno, the intermediate conveyor 7 has a velocity which is greater than that of the belt 6 in order to achieve longitudinal spacing of the articles 2 from each other. The intermediate conveyor 7 "...has a length such that there is never more than one article present thereon." The sole purpose of the intermediate conveyor 7 is to receive one article 2 at a time from the accumulating conveyor 6 and to accelerate that one article 2 so that it will be delivered to the wrapping machine conveyor 4 in a proper phased relationship; i.e. so that each such article 2 will be engaged by one of the fixed blades or lugs 5 that are carried by the wrapping machine conveyor 4.

A sensor, generally at 8, is positioned adjacent the intermediate conveyor 7. That sensor 8 is controlled by the wrapping machine conveyor 4, as set forth at column 2, lines 35-40. The sensor 8 includes four photoelectric cells 9 to 12. Each one of these photoelectric cells 9 is either obscured by the article 2 or is not obscured by the article 2, as depicted in Figs. 2, 3 and 4. By sensing which one or ones of the photoelectric cells are obscured, and which are clear, the position of the single article 2 on the intermediate belt 7 can be determined. Since the photoelectric cells are controlled by the wrapping machine conveyor 4, they will be activated when the wrapping machine conveyor 4 determines that the next article 2 to be delivered to it should be located in its correct location on the intermediate conveyor 7.

Referring to Figs. 2-4, there is depicted in Fig. 2, a situation where the product 2 is in the correct location on the intermediate conveyor 7. That means that it will be delivered to the wrapping machine conveyor 4 at a location on conveyor 4 so that the article 2 will be engaged by the blade or lug 5. In Fig. 3 there is depicted the situation where the article 2 is located slightly ahead of its desired position on the intermediate conveyor 7. If no change is made, the article 2 shown in Fig. 3 will be deposited on the wrapping machine conveyor 4 ahead of the blade or lug 5 that should engage it. The result would be that the article 2 would arrive at the wrapping machine too early. As discussed at the bottom of column 2, if the photoelectric cell 10 and possibly also the photoelectric cell 9 are not obscured, when these cells are actuated by the wrapping machine conveyor 4, this means that the article 2 is too far back on the intermediate conveyor 7. If this is not corrected, the article 2 will be placed on the wrapping machine

conveyor 4 either in interference with the blade or lug 5 or behind the blade or lug 5. In either instance, it would likely arrive at the wrapping machine 3 too late.

The wrapping machine conveyor 4 actuates the photoelectric cells 9-12. These cells are turned on at a time at which an article 2 should be positioned on the intermediate conveyor 7 in a position so that it will be transferred to the wrapping machine conveyor 4 in proper alignment with a respective one of the blades or lugs 5. If the photoelectric cells determines that the article is in the correct position on intermediate conveyor 7, no change in the speed of conveyor 7 is needed. However, if the sensor means 8 determines that the sole article 2 on the intermediate conveyor 7 is not in its proper position; i.e. is out of phase with the wrapping machine conveyor 4, the speed of the intermediate conveyor 7 has to be changed. If the sole article 2 is too close to its being deposited onto the wrapping machine conveyor 4, the intermediate conveyor 7 is slowed down. If the sole article 2 is too far away from the wrapping machine conveyor 4, the intermediate conveyor 7 is sped up. This is discussed at column 3, lines 4-15.

It is quite clear that any logical combination of the Bressert and Bruno references would not result in a device that would be similar to the subject invention, as recited in currently amended claim 22. The combination advanced in the Final Office Action overlooks the clear teachings of both of the references.

It is very well known that products which are going to be longitudinally folded have to be spaced from each other. In the present invention, such a spacing is accomplished by providing a shunt, as seen in Fig. 10. The purpose of the shunt is to divert each successive one of the plurality of products to one or the other of two

longitudinal folding machines. As each product is received at its respective one of the two longitudinal folding machines, its speed of travel is typically reduced. The spacing between successive products is needed to allow each product to effectively stop its forward travel, while it is being folded, without the next product arriving.

The same general principal applies to the wrapping machine described in Bruno. The wrapping of each product takes a finite amount of time. To provide that time, the products are spaced on the wrapping machine conveyor 4 by engagement with the spaced blades or lugs 5. By the time the individual products 2 are placed on the wrapping machine conveyor 4, they have already been properly positioned by operation of the intermediate conveyor 7. It is the intermediate conveyor 7 whose speed is increased or decreased to insure that each article arrives at the wrapping machine conveyor 4 in phase with the particular blade or lug 5 that will engage its rear surface and that will carry it to the wrapping machine 3 at the proper time.

The photoelectric cells 9-12 or 16 are not used in any way to control the operation of the wrapping machine 3 or to control the speed of the wrapping machine conveyor belt 4. Instead, the wrapping machine conveyor 4 actuates the photoelectric cell or cells based on the location of successive ones of its lugs or blades 5. As soon as an article 2 is deposited on the wrapping machine belt 4, the photoelectric cells are used to determine the location of the next article 2, which is located on the intermediate belt 7. If that next article 2 is not in a position, on intermediate belt 7, so that it will be placed in the right location on belt 4, the motor drive 15 for the intermediate belt 7 is adjusted to speed up or to slow down the linear speed of intermediate conveyor 7.

The closest structure in the subject device to the structure shown in Bruno can be seen in Fig. 10 of the subject application. A stream of products 02 are conveyed along a track 33 towards a shunt 34. The shunt splits the products 02 into two separate streams each of which goes to a separate longitudinal folding device. As is discussed at paragraph 053 of the Substitute Specification, the system has a sensor 39 which is usable to detect a position or a phase relation of the products. As the products 02 enter into view of the sensor 39, that sensor provides an output signal to the drive mechanism 42 for the shunt. This insures that the product stream is properly split into two streams, each with spaced products. Those spaced products 02 then proceed along to a respective one of the two folding machines. It is at those folding machines where the subject invention, as recited in currently amended claim 22 comes into operation.

The combination set forth by the Examiner is not logical. As indicated above, the Bruno photoelectric cell or cells are usable to determine the location of a single article 2 on an intermediate conveyor 7. The speed of travel of that intermediate conveyor is changed in response to the signal provided by the sensor 8. That speed change is conferred to the intermediate conveyor 7. It is not used to speed up or to slow down the speed of operation of the wrapping machine 3. It is that wrapping machine 3 which would be the most similar to the longitudinal folding apparatus 01 of the present invention.

It is true that Bruno uses a sensor 8 to vary a speed of an intermediate conveyor 7. However, that speed is adjusted only so that the individual articles to be wrapped by the wrapping machine 3 will be deposited on a wrapping machine feed conveyor 4 in a proper spaced array. The sensor means 8 of Bruno is under the control of the wrapping

machine conveyor 4. It does not control the wrapping machine conveyor 4. It is used to control the speed of the intermediate conveyor 7. At best, if Bruno and Bressert were to be combined, the resultant device would include an upstream conveyor in Bressert which would be controlled, as taught by Bruno, to deliver the individual products 12 to the feed table of Bressert in a spaced array. The need to deliver the products 12 of Bressert to the feed table in such a spaced array is depicted in the sole drawing figure and is at least suggested in paragraph 001 of the machine translation of that document. It is thus respectfully submitted that the product folding apparatus, as recited in currently amended claim 22 is not anticipated by the Bressert reference. It is also respectfully submitted that any combination of Bressert and Bruno which could reasonably be made would also not render obvious the product folding apparatus, as set forth in currently amended claim 22.

All of the rest of the claims which are now pending in the subject US patent application depend, either directly or indirectly, from believed allowable currently amended claim 22. The two secondary references cited and relied on to show the features of these claims do not provide the teachings of the subject invention which are missing from the two primary references.

SUMMARY

A Request For Continued Examination is being filed concurrently with the filing of this Fourth Amendment. Claim 22 has again been amended in yet a further effort to patentably define the subject invention over the prior art cited and relied on. For the reasons set forth above, it is believed that the claims now pending in the subject application are patentable. Allowance of the claims, and passage of the application to issue is respectfully requested.

Respectfully submitted,

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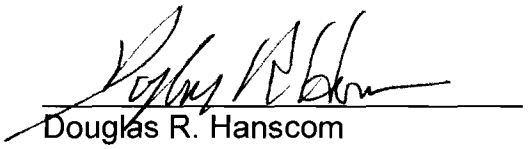

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